

REMARKS/ARGUMENTS

This case has been carefully reviewed and analyzed in view of the Office Action dated 21 November 2008. Claim 1 has been amended because of a typographical error.

In the Office Action, the Examiner rejected Claim 1 under 35 U.S.C. § 102(b) as being anticipated by the Shibuya, et al. reference (U.S. Patent 4,783,429) (hereinafter the “Shibuya reference”).

Prior to a discussion of the reference relied upon by the Examiner in the Office Action, it is believed that it would be beneficial to briefly review the composition of the glass-ceramic of the subject Patent Application as defined by independent Claim 1. The present invention is directed to a biodegradable and bioactive glass-ceramic. The glass-ceramic of the subject Patent Application is fabricated from a composition consisting of 41.40 ~ 45.75% by weight of calcium oxide (CaO), 35.0 ~ 47.62% by weight of silica (SiO₂), 0.50 ~ 14.58% by weight of boron oxide (B₂O₃), 0.46 ~ 4.14% by weight of magnesium oxide (MgO), 0.05 ~ 0.45% by weight of calcium fluoride (CaF₂), and 1.62 ~ 14.58% by weight of phosphorus pentoxide (P₂O₅).

In this manner, the present invention provides the distinct advantage of providing for an artificial bone or bone cement that is capable of directly bonding to bones while also having the unique ability to slowly degrade so that new bone can eventually form and replace the degrading biodegradable and bioactive glass-

ceramic. Specifically, when the glass-ceramic composition of the subject Patent application is fabricated outside of the ranges claimed in independent Claim 1, glass formation becomes difficult or sintering cannot be effectively accomplished due to “too high [of] a crystallization rate.” (Specification, page 3, lines 20-21). Even if glass formation is accomplished, and the sintering is effectively accomplished, the resulting glass-ceramic will either too slowly or too quickly biodegrade for the purposes and objectives as stated in the Specification. (See, Specification, lines 10-23).

The Examiner has rejected Claim 1 under 35 U.S.C. § 102(b) as being anticipated by the Shibuya reference. The Shibuya reference is directed to a biocompatible glass-ceramic comprising, by weight, 7-16% MgO, 20-45% CaO, 41-50% SiO₂, 8-30% P₂O₅, 0-5% B₂O₃, 0-5% F₂, and 0-10% Al₂O₃. (See, Shibuya reference, Abstract). At the outset, it is to be noted that the cited reference is completely devoid of calcium fluoride (CaF₂). What is more, is that the cited reference includes a range of magnesium oxide (MgO) of 7-16% by weight. The subject Patent Application, however, uses magnesium oxide (MgO) at 0.46 – 4.14% by weight. As is clearly stated in the Specification of the subject Patent Application, the glass-ceramic as disclosed in independent Claim 1 has been fabricated with certain weight percentages to ensure that the glass-ceramic composition is highly bioactive and readily biodegradable. To obtain these properties, the glass-ceramic composition must be formed out of the ranges

claimed. To do otherwise, would make glass formation difficult or sintering insufficiently carried out.

Simply put, it is the disclosed ranges that permit the glass-ceramic of the subject Patent Application to perform its function. These ranges certainly include the weight percentages of magnesium oxide (MgO) and calcium fluoride (CaF₂) - an element wholly unfounded in the Shibuya reference.

Although commonalities exist between some of the elements of the composition of the subject Patent Application and the Shibuya reference, the Shibuya reference does not provide for a biodegradable and bioactive glass-ceramic fabricated from a composition consisting of "*0.46 ~ 4.14% by weight of magnesium oxide (MgO), [and] 0.05 ~ 0.45% by weight of calcium fluoride (CaF₂) ...*" as defined by independent Claim 1.

Accordingly, the subject Patent Application as defined by independent Claim 1 is believed to show patentable distinction over the Shibuya reference. As the Shibuya reference fails to disclose each and every one of the elements of the instant invention, as now provided by independent Claim 1, the Shibuya reference cannot anticipate that invention. Further, as the Shibuya reference fails to suggest such a combination of limitations, the Shibuya reference cannot make obvious the invention of the subject Patent Application either.

It is now believed that the subject Patent Application has been placed fully in condition for allowance, and such action is respectfully requested.

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Reply to Office Action dated 21 November 2008

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Respectfully submitted,
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